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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
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EXAMINER	
LEUNG, JENNIFER A	

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/092,956	KEMP ET AL.
	Examiner	Art Unit
	Jennifer A. Leung	1764

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2004*.

2a)☐ This action is FINAL. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,6-12,15-19,24,31-45,47,49-62,67-73,76-88,90,91 and 93-99* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,6-12,15-19,24,31-45,47,49-62,67-73,76-88,90,91 and 93-99* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 15, 2004 has been entered.

Response to Amendment

2. Applicant's amendment submitted on March 15, 2004 has been received and carefully considered. Claims 2-5, 13, 14, 20-23, 25-30, 46, 47, 48, 63-66, 74, 75, 89 and 92 are cancelled. Claims 1, 6-12, 15-19, 24, 31-45, 47, 49-62, 67-73, 76-88, 90, 91 and 93-99 remain active.

Response to Arguments

3. Applicant's amendments and arguments filed March 15, 2004 with respect to the rejection(s) of claim(s) 1, 6-12, 15-19, 24, 31-45, 47, 49-62, 67-73, 76-88, 90, 91 and 93-99 have been fully considered. In view of Applicant's amendments and corresponding arguments, said rejections have been withdrawn. However, upon further consideration, new grounds of rejection are made in view of newly found prior art references (see below).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States

4. Claims 1, 18, 19, 24, 32, 34, 39, 40, 50, 53, 58, 59, 62, 83, 84 and 97 are rejected under 35 U.S.C. 102(b) as being anticipated by Seavey (US 2,684,287).

Regarding claims 1, 18, 19, 24, 34, 39, 53, 58, 62, and 83, Seavey (FIG. 1, 2) discloses an apparatus suitable for mixing an acid with a base (column 1, lines 1-11), comprising:

a chamber (i.e., defined by cylindrical wall **4**);

a distribution-blending-cooling dish suspended therein (i.e., dish **1**);

an acid delivery system for spraying acid into the chamber and onto said dish (i.e., conduit **11** and header **12**, having lower perforations; column 4, lines 9-24, 57-67), wherein the acid delivery system is capable of regulating a rate of flow and an amount of acid sprayed into the chamber (i.e., using a "quick interruption device" or other suitable type of device; column 4, lines 25-34); and

a base delivery system for spraying the base into the chamber and onto said dish (i.e., conduit **13** and header **14**, having lower perforations; column 4, lines 9-24, 57-67), wherein the base delivery system is capable of regulating a rate of flow of an amount of the base sprayed into the chamber (i.e., using a "quick interruption device" or other suitable type of device; column 4, lines 25-34);

wherein the acid and base delivery systems are separate (see FIG. 1, 2);

wherein the blending of acid and base inherently comprises some in-air mixing above said dish and proximate the delivery systems (i.e., from impingement of the sprays exiting from the perforations in headers **12** and **14**);

wherein progressive mixing continues within said dish, said dish being concave and having a depth which forces the acid and base to mix within a thin layer on the surface of said dish

(column 2, line 12 to column 3, line 14), and wherein *in situ* mixing follows within the chamber below said dish (column 3, lines 20-33).

Regarding claims 32 and 50, Seavey discloses an acid reservoir and a base reservoir (i.e., "From *a suitable source, not shown*, the heavier reactant is delivered through conduit **11** .. Similarly, from *a suitable supply, not shown*, a conduit **13** delivers another reactant to header **14**," column 4, lines 1-24, FIG. 1, 2).

Regarding claims 40 and 84, Seavey discloses the acid delivery system introduces acid into the chamber at different points within the chamber (i.e., via header **11**, "... near each end thereof, so that streams of reactant are delivered to the dish **1** on substantially opposite sides of the center thereof," column 4, lines 9-16).

Regarding claim 59 and 97, Seavey discloses a precipitate chamber (i.e., conical portion **8**; FIG. 1; column 4, lines 1-4) connected to the chamber (defined by wall **4**).

Instant claims 1, 18, 19, 24, 32, 34, 39, 40, 50, 53, 58, 59, 62, 83, 84 and 97 structurally read on the apparatus of Seavey.

5. Claims 1, 18, 19, 24, 34, 39, 53, 58, 62 and 83 are rejected under 35 U.S.C. 102(b) as being anticipated by Buhtz (US 1,629,200).

Regarding claims 1, 18, 19, 24, 34, 39, 53, 58, 62 and 83, Buhtz (FIG. 1) discloses an apparatus comprising:

a chamber (i.e., defined by cylindrical casing **a**);

a distribution-blending-cooling dish suspended therein (i.e., defined by conical plates **f** and **g**);

a first delivery system for spraying a first liquid into the chamber and to said dish (i.e., via pipe **m**, having a lower flaring portion), defining the recited, "acid delivery system", wherein

the first delivery system is inherently capable of regulating a rate of flow of an amount of first liquid sprayed into the chamber (i.e., "The liquids are supplied to the pipes **m** and **n** in *measured amounts*, so that they meet in the *correct proportion* on the plate **g**, thus insuring *exact reaction* and avoiding by-reactions," page 1, lines 76-81); and

a second delivery system for spraying a second liquid into the chamber via said dish (i.e., pipe **n**, having a lower flaring portion), defining the recited "base delivery system", wherein the second delivery system is inherently capable of regulating a rate of flow of an amount of second liquid sprayed into the chamber (i.e., "The liquids are supplied to the pipes **m** and **n** in *measured amounts*, so that they meet in the *correct proportion* on the plate **g**, thus insuring *exact reaction* and avoiding by-reactions," page 1, lines 76-81);

wherein the first and second delivery systems are separate (see FIG. 1);

wherein the blending of the first and second liquids inherently comprises some in-air mixing above said dish and proximate the delivery systems (i.e., from impingement of the sprays of the first and second liquids exiting from the lower flaring portions of pipes **m** and **n**);

wherein mixing continues within said dish, said dish having a concave shape and a depth that forces the liquid to mix within a thin layer (page 1, lines 9-20), and wherein *in situ* mixing of the liquids follows within the chamber below said dish (page 1, lines 93-104).

Instant claims 1, 18, 19, 24, 34, 39, 53, 58, 62 and 83 structurally read on the apparatus of Buhtz.

6. Claims 1, 32, 34, 35, 39, 50, 53, 54, 58 and 59 are rejected under 35 U.S.C. 102(b) as being anticipated by Reynoso (US 185,964).

Regarding claim 1, Reynoso (FIG. 1-3) discloses an apparatus comprising:

a chamber (cylindrical portion **a** of producing vessel **A**);

a distribution-blending-cooling dish suspended therein (cup **b'**);

a first delivery system (comprising one of supply tanks **B**, **B'** and tubes **b**; see FIG. 2) for introducing liquid sulphuric acid into the chamber **a** and to dish **b'**, defining the recited "acid delivery system"; and

a second delivery system (comprising the other of supply tanks **B**, **B'** and tubes **b**) for introducing a bisulphite of soda or other bisulphite into the chamber **a** via dish **b'**, defining the recited "base delivery system",

wherein the first and second delivery systems are separate; and

wherein dish **b'** has a concave shape and a depth that inherently forces the acid and bisulphite to mix within a thin layer, wherein *in situ* mixing subsequently occurs within the chamber **a** below (i.e., "... [sulphuric acid and bisulphite] pass through tubes **b b** and fall into the cup **b'**, where the sulphuric acid and bisulphite react on each other, and produce sulphurous acid gas. Should any of the liquid fall from the cup **b'** the reaction will be completed on the conical bottom of the vessel, but the cup generally suffices for the continuous reaction of the liquids." See page 1, column 2, paragraph 2).

Regarding claim 32, Reynoso discloses the first delivery system comprises an acid reservoir (sulphuric acid supply tanks **B**, **B'**; FIG. 1, 2).

Regarding claims 34, 35 and 39, Reynoso discloses the first delivery system comprises a device to regulate a rate of flow or the amount of sulphuric acid delivered from tanks **B**, **B'** to chamber **a**, wherein the device comprises an acid flow valve (cock **k**, cock **L**, rod **M**; FIG., 1, 2, 3; page 1, column 2, last paragraph).

Regarding claim 50, Reynoso discloses the second delivery system comprises a reservoir containing bisulphite of soda (tanks **B**, **B'**; FIG. 1, 2), defining the recited "base reservoir".

Regarding claims 53, 54 and 58, Reynoso discloses the second delivery system comprises a device to regulate a rate of flow or the amount of the bisulphite of soda delivered from tanks **B**, **B'** to chamber **a**, wherein the device comprises a flow valve (cock **k**, cock **L**, rod **M**; FIG., 1, 2, 3; page 1, column 2, last paragraph), defining the recited "base flow valve".

Regarding claim 59, Reynoso (Figure) discloses a precipitate chamber (conical bottom a^2) connected to chamber **a**, for collecting any solid precipitates generated by the reaction.

Instant claims 1, 32, 34, 35, 39, 50, 53, 54, 58 and 59 structurally read on the apparatus of Reynoso.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 6-8, 15-17, 67-69 and 76-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seavey (US 2,684,287) OR Buhtz (US 1,629,200) in view of Bernas (US 3,430,804).

Seavey and Buhtz are each silent as to the inside surface of the chamber or dish comprising a non-corrosive coating, such as ethyl tetrafluoro ethylene or a derivative of a fluoro polymer. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the apparatus of Seavey OR Buhtz such that chamber or dish comprised a non-corrosive coating, since provision of such linings in apparatus for processing highly corrosive acids is well known in the art, as evidenced by Bernas. As taught in column 1 (lines 48-55), "In order to preclude reaction between the chemical constituents and the material of the decomposition vessel, *polytetrafluoroethylene (Teflon) liners* and stoppers in stainless steel or the like "bombs" have been utilized." Also, as taught in column 2 (lines 51-54), "... although Teflon is utilized as the preferred material for the bucket or liner and the sealing disk, *any suitable material which is chemically resistant to the reactants* may be substituted therefor."

8. Claims 9, 10, 33, 51, 52, 70, 71 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seavey (US 2,684,287).

Regarding claims 9, 10, 70 and 71, Seavey discloses, "suitable temperature measuring and control devices, such as thermo-couples **17** and **18**, may be applied where and as needed in the apparatus as, for example, in the supply line **11** and beneath the baffle **10**," (column 4, lines 35-39; FIG. 1). Such is required because "Nitroglycerine also decomposes when in contact with acid, the rate of such decomposition being influenced by the temperature. The higher the temperature, the more rapid the decomposition. This decomposition also reduces the yield."

(column 1, lines 12-32). Thus, it is crucial to control the temperature of the acid and base mixture within the chamber, in order to maximize the yield of product.

Seavey further discloses the apparatus comprises a chamber cooling means (i.e., jacket **5** connected to heat exchange medium, i.e., refrigerant, inlet pipe **7** and outlet pipe **6**; column 3, lines 61-75) coupled to the chamber. Although Seavey is silent as to whether the jacket **5** may instead comprise a "coil", it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to substitute a coil for the jacket in the modified apparatus of Seavey, on the basis of suitability for the intended use, since such cooling means are well known in the art, and the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

Regarding claims 33, 51, 52 and 94, Seavey discloses, "suitable temperature measuring and control devices, such as thermo-couples **17** and **18**, may be applied where and as needed in the apparatus as, for example, *in the supply line 11* and beneath the baffle **10**," (column 4, lines 35-39). Thus, the apparatus inherently comprises means for regulating the temperature of the acid and/or base supply. Although Seavey is silent as to the temperature control devices comprising an acid reservoir cooling coil or a base reservoir cooling coil, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select such means for the temperature control devices in the apparatus of Seavey, since such means are conventionally known, and substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

9 Claims 11, 12, 72 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seavey (US 2,684,287) in view of Buhtz (US 1,629,200).

Seavey discloses, "suitable temperature measuring and control devices, such as thermo-couples **17** and **18**, may be applied where and as needed in the apparatus as, for example, in the supply line **11** and beneath the baffle **10**," (column **4**, lines 35-39). Such is required because, "Nitroglycerine also decomposes when in contact with acid, the rate of such decomposition being influenced by the temperature. The higher the temperature, the more rapid the decomposition. This decomposition also reduces the yield," (column 1, lines 12-32). Thus, it is very important to control the temperature of the acid and base reaction occurring on dish **1**, in order to maximize the yield of product. Seavey is, however, silent as to the "suitable temperature measuring and control devices" comprising a dish cooling coil coupled to the distribution-blending-cooling dish **1** for lowering the temperature of the dish.

Buhtz discloses an apparatus for mixing reactants, similar to the apparatus of Seavey, wherein the apparatus of Buhtz comprises a distribution-blending-cooling dish (i.e., defined by conical plates **f** and **g**) for mixing liquid reactants supplied via pipes **m** and **n** as a thin film on plate **g**; the dish comprising a dish cooling means (i.e., cooling medium admitted through pipe **i** to chamber **h** and through outlet **j**; FIG. 1; page 1, lines 84-92) to regulate its temperature. It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a dish cooling means to the dish **1** in the apparatus of Seavey, because the dish cooling means allows the temperature of the reaction occurring on the dish to be regulated, thereby minimizing the occurrence of by-reactions, as taught by Buhtz (page 1, lines 1-26). Although the dish cooling means as taught by Buhtz is in the form of a jacket chamber **h**, it

would have further been an obvious design choice for one of ordinary skill in the art at the time the invention was made to substitute a "coil" for the jacket in the modified apparatus of Seavey, on the basis of suitability for the intended use, since such cooling means are well known, and the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

10. Claims 31, 35-38, 49, 54-57, 79, 81, 82, 93, 95 and 96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seavey (US 2,684,287) in view of Jerome (US 5,248,577).

Seavey discloses, "From a suitable source, not shown, the heavier reactant is delivered through a conduit **11**... Similarly, from a suitable supply, not shown, a conduit **13** delivers another reactant," (column **4**, lines 9-24), wherein, "one or both of the conduits **11** and **13** may be provided with a quick interruption device of the swivel or other suitable type," (column 4, lines 25-34). Thus, the delivery systems inherently comprise means for delivering and regulating the supply of acid and base to the chamber. Seavey, however, is silent as to the specifically recited control elements for performing the delivery and regulation of the acid and base (i.e., an acid/base pump, an acid/base flow valve, an acid/base flow meter, a programmable acid/base flow controller). In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide such control elements to the apparatus of Seavey, on the basis of suitability for the intended use, because the use of pumps, valves, flow meters, flow controllers and other known control elements for enabling automatic and continuous regulation of reaction processes is well known to those having ordinary skill in the art. To evidence conventionality, Jerome (FIG. 1; column 4, lines 33-64) teaches an apparatus for controlling the

supply of reactants (i.e., acids and bases, column 5, lines 14-25) to a precipitation vessel **16**, wherein the reactant delivery systems each comprise a supply reservoir (vessels **24, 34**), a device for regulating the flow of each reactant from each reservoir (flow controllers **30, 40**) and control means comprising flow meters **28, 38** and a programmable flow controller (process controller **32**). Also, the provision of automated means to replace manual activity was held to have been obvious, *In re Venner* 120 USPQ 192 (CCPA 1958); *In re Rundell* 9 USPQ 220 (CCPA 1931)

11. Claims 41-45, 47, 60, 61, 85-88, 90, 91, 98 and 99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seavey (US 2,684,287) in view of Platz, deceased, et al. (US 4,164,541).

Regarding claims 41-45, 47, 85-88, 90 and 91, Seavey discloses, "... it is important that the acid and glycerine be mixed quickly and uniformly, else the yield is poor. If mixing is not accomplished rapidly and uniformly, local overheating occurs, causing part of the glycerine or nitroclycerine to decompose, thus reducing yield." (column 1, lines 12-33). Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide sufficient/additional mixing means for ensuring that the acid and base were rapidly and well mixed in the apparatus of Seavey, to minimize local overheating that can cause reduced yield.

Seavey is silent as to the sufficient/additional mixing means comprising the recited vortex generator. Platz, deceased, et al. (FIG. 1-3, 5; column 2, line 47 to column 5, line 46) teaches a mixing chamber **10** comprising a plurality of eductors (i.e. venturi pumps **20, 20', 21**) mounted inside the chamber at different elevations, wherein the eductors are in fluid communication with an electric auxiliary pump **18, 18'** via lines **19, 19'**. The placement or direction of the eductors controls the formation of the vortex (i.e., see flow lines indicating circular fluid flow). Additionally, the pump **18, 18'** (of which the peristaltic type is well known) would inherently

crush any particles present in the reaction mixture by virtue of the continuous recirculation. It would have been obvious for one of ordinary skill in the art at the time the invention was made to select the vortex generator of Platz for the sufficient/additional mixing means in the apparatus of Seavey, on the basis of suitability for the intended use, because the high velocity flow would further promote rapid reaction of the acid and base while preventing the lumping of the salts formed during the reaction, as taught by Platz (column 1, line 33 to column 2, line 25).

Regarding claims 60, 61, 98 and 99, Seavey discloses, "It is thus desirable in a nitrator to have only a very small hold-up of the reaction products so that said reaction products can quickly be delivered to the next step of the process where the nitroglycerine will be separated from the acid, neutralized, and thus stabilized to prevent its further decomposition," (column 1, lines 26-33). Thus, the apparatus of Seavey inherently comprises a means for separating the product from the acid and a storage chamber for containing the separated, stabilized product or the separated acid. Although Seavey is silent as to the means for separating the product comprising a "filter chamber" connected to the precipitate chamber, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select a filter chamber for enabling the separation of the product from the reaction mixture in the apparatus of Seavey, since filtration is a well known means for separating a solid precipitant from a liquid. Platz, deceased, et al. (Figures; column 1, lines 50-54; column 3, lines 33-40) evidences this concept by teaching a filter chamber (as defined by cylindrical screen **15**) connected to a precipitate chamber (conical bottom **12**), wherein filter chamber **15** removes any large chunks of material prior to passing the mixture via outlet pipe **14** to a storage chamber (inherent, not shown).

12. Claims 18, 19, 24, 31, 49, 62, 83 and 97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reynoso (US 185,964) in view of Roueche et al. (US 5,074,671).

Regarding claims 18, 19 and 24, Reynoso is silent as to tubes **b'** of the acid and base delivery systems each comprising a spray mechanism, or whether the angled tubes **b'** of the acid and base delivery systems are strategically placed to introduce the sulphuric acid and bisulphite of soda into the chamber **a** in a manner that causes "in-air mixing" of the reactants above dish **b'**.

Roueche et al. (FIG. 1, 3; column 1, lines 19-56; column 2, lines 5-58) teaches a mixing apparatus for producing a homogeneous mixture of two liquids, wherein the apparatus comprises a container **1** and a preliminary mixer in the form of an arcuate plate **9** or "target means". The two liquids are each injected via a spray mechanism (nozzle **8**), wherein the nozzles **8** are suitably oriented to converge and partially mix the two liquids "in-air" (see streams **10, 11**; FIG. 3) prior to meeting at the arcuate plate **9** and falling into the bottom of the container **1** for additional mixing. It would have been obvious for one of ordinary skill in the art at the time the invention was made to configure tubes **b'** of each of the acid and base delivery systems with a spray mechanism, and it would have further been obvious for one of ordinary skill in the art at the time the invention was made to strategically place the outlets of tubes **b'** in a manner such that "in-air mixing" of the two reactants occurs above dish **b'** in the apparatus of Reynoso, because spraying the liquids into contact with each other before and upon contacting the target (i.e., the distribution-blending-cooling dish **b'** of Reynoso) allows mixing of the two liquids to begin immediately, thereby providing an efficient means for producing a homogenous mixture in a short amount of time, as taught by Roueche et al.

Regarding claims 31 and 49, Roueche et al. teach that the two fluids delivered via inlet

pipes 6, 7 having nozzles 8, "are injected into the container 1 *under pressure* and [impinge] on the plate 9 defining the target," (column 2, lines 53-58). Although a pump is not explicitly stated or shown, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a pump to the acid and base delivery systems in the apparatus of Reynoso, for enabling the disclosed distribution of fluids "under pressure", since use of pumps, or other known fluid circulation means, for distributing a fluid under pressure is well known in the art.

Regarding claims 62 and 83, Reynoso (FIG. 1-3) discloses an apparatus comprising:

a chamber (cylindrical chamber **a** of producing vessel **A**);

a distribution-blending-cooling dish suspended therein (cup **b'**);

a first delivery system (comprising one of supply tanks **B, B'** and tubes **b**; see FIG. 2) for introducing liquid sulphuric acid into the chamber **a** and to dish b', defining the recited "acid delivery system"; and

a second delivery system (comprising the other of supply tanks **B, B'** and tubes **b**) for introducing a bisulphite of soda or other bisulphite into the chamber **a** via dish **b'**, defining the recited "base delivery system",

wherein the first and second delivery systems are separate;

wherein the first and second delivery systems are each capable of regulating a rate of flow and the amount of sulphuric acid or bisulphite of soda delivered from tanks **B, B'** to chamber **a** (i.e., using cock **k**, cock **L**, rod **M**; FIG., 1, 2, 3; page 1, column 2, last paragraph); and

wherein dish **b'** has a concave shape and a depth that inherently forces the acid and bisulphite to mix within a thin layer on said dish **b'**, with *in situ* mixing following within the chamber **a** below (i.e., " [sulphuric acid and bisulphite] pass through tubes **b b** and fall into the cup

b', where the sulphuric acid and bisulphite react on each other, and produce sulphurous acid gas. Should any of the liquid fall from the cup **b'** the reaction will be completed on the conical bottom of the vessel, but the cup generally suffices for the continuous reaction of the liquids." See page 1, column 2, paragraph 2).

Reynoso is silent as to tubes **b'** delivering sulphuric acid and bisulphite of soda to the chamber **a** in the form of a "spray". Roueche et al. (FIG. 1, 3; column 1, lines 19-56; column 2, lines 5-58) teaches a two-stage mixing apparatus for producing a homogeneous mixture, wherein the apparatus comprises a container **1** and a preliminary mixer in the form of an arcuate plate **9** or "target means", wherein two liquids injected as a spray via nozzle **8** are suitably oriented to converge and meet at the arcuate plate **9** prior to falling to the bottom of the container **1** for further mixing. It would have been obvious for one of ordinary skill in the art at the time the invention was made to configure tubes **b'** with nozzles in the apparatus of Reynoso, such that the sulphuric acid and bisulphite of soda were "sprayed" into chamber **a**, because spraying the two liquids into contact with each other would allow for simultaneous, overlapping impingement of the reactants upon the target (i.e., the distribution-blending-cooling dish of Reynoso), thereby initiating the mixing of the two liquids and providing an efficient means for producing a homogenous mixture, as taught by Roueche et al.

Regarding claim 97, Reynoso (Figure) discloses a precipitate chamber (conical bottom a^2) connected to chamber **a**, for collecting any solid precipitates generated by the reaction of sulphuric acid with bisulphite of soda.

13. Claims 6-8 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reynoso (US 185,964) in view of Bernas (US 3,430,804), and claims 67-69 and 76-78 are

rejected under 35 U.S.C. 103(a) as being unpatentable over Reynoso (US 185,964) in view of Roueche et al. (US 5,074,671), as applied to claim 62 above, and further in view of Bernas (US 3,430,804).

Reynoso (or the collective teachings of Reynoso and Roueche et al.) is silent as to the inside surface of the chamber **a** or the distribution-blending-cooling dish **b'** comprising a non-corrosive coating, such as ethyl tetrafluoro ethylene or a derivative of a fluoro polymer. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the apparatus of Reynoso such that chamber **a** or cooling dish **b'** comprised a non-corrosive coating, since the provision of such linings in apparatus containing highly corrosive acids is well known in the art, as evidenced by Bernas. The same comments with respect to Bernas apply (see above).

14. Claims 36-38 and 55-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reynoso (US 185,964) in view of Jerome (US 5,248,577); and claims 79, 81, 82, 93, 95 and 96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reynoso (US 185,964) in view of Roueche et al. (US 5,074,671), as applied to claim 62 above, and further in view of Jerome (US 5,248,577).

Reynoso discloses the delivery systems each comprise a device to regulate the flow of acid or base from their respective supply reservoirs (tanks **B, B'**), wherein the device comprises a flow valve (i.e., cock **k**, cock **L**, rod **M**; FIG., 1, 2, 3; page 1, column 2, last paragraph) and a control means (i.e., float controller **L'** for opening cock **L**; user manipulation of handled rod **M**) for ensuring a "perfectly uniform and regular" reaction of the bisulphite on the sulphuric acid However, Reynoso is silent as to the control means comprising a flow meter coupled to the flow

valve **k**, **L**, **M** and a programmable flow controller that monitors the flow meter and adjusts the flow valve **k**, **L**, **M** accordingly to maintain a predetermined rate of flow for each the acid and base. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to supply a flow meter and a programmable flow controller to the control means of Reynoso, on the basis of suitability for the intended use, since the provision of automated means to replace manual activity was held to have been obvious, *In re Venner* 120 USPQ 192 (CCPA 1958); *In re Rundell* 9 USPQ 220 (CCPA 1931), and furthermore, use of flow meters and programmable flow controllers for regulating the supply of reagents is well known in the art of process control. The same comments with respect to Jerome apply (see above).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung
May 12, 2004 JAL

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PRIMARY EXAMINER